St. Andrews Scots Sr. Sec. School

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Session: 2025 – 2026
(Answer Key)

Class: VII | **Subject: Science** | **Chapter: Heat and Temperature**

CHECK POINT 1

1. (T) 2. (T) 3. (F) 4. (F) 5. (T)

CHECK POINT 2

1. (T) 2. (F) 3. (T) 4. (F) 5. (T)

PRACTICE TIME

A. Tick the correct answers:

1. (a) 2. (b) 3. (b) 4. (d) 5. (a)

B. Assertion – Reason type questions:

1. (b) 2. (c) 3. (b) 4. (d)

C. Fill in the blanks:

1. Heat 2. Anders Celsius 3. 32 4. Clinical

D. Very short answer type question:

1. Heat is a form of energy which can be transformed into other forms of energy like electrical energy, light energy, mechanical energy etc.

2. Geyser, electric iron and electric bulb. In an electric bulb, the electrical energy gets transformed into heat energy of the filament, which is then transformed into light energy.

3. The thermometer which is used to measure the body temperature of humans is called clinical thermometer.

4. A laboratory thermometer is generally used to measure temperatures ranging from -10◦C to 110◦C.

5. There is a kink near the bulb in the capillary tube of a clinical thermometer but not in that of a laboratory thermometer.

E. Short Answer Questions:

1. We feel hot after rubbing our palms together because in doing so our muscular energy is transformed into heat energy.

2. The temperature is a measure of the degree of hotness or coldness of a body. The device used for measuring the temperature of a body is called thermometer.

3. It is convenient to use digital thermometer because it measures temperature accurately using thermistor instead of mercury and shows the reading in the form of digits.

4. If a thermometer falls or breaks while giving jerks and the mercury spills in the form of small droplets, then take a small ball of kneaded wheat flour and roll it over the mercury droplets to pick them all. Put this contaminated wheat flour ball in a polythene bag, give it a tight knot and hand it over to your nearest pharmacy to dispose it off.

5. The two common scales for measuring temperature are Celsius scale and Fahrenheit scale.
   - On Celsius scale, the freezing point of water is taken as 0°C

and boiling point as 100°C.

- On Fahrenheit scale, water freezes at 32°F and boils at 212°F.

F. Long answer type questions:

1. Heat energy can be transformed or changed into other forms of energy.

- In a thermal power station, heat energy is produced by burning coal and is transformed into electrical energy.
- In a steam engine, heat energy is transformed into mechanical energy. Similarly, other forms of energy are also transformed into heat energy.
- During the working of an iron, a geyser or a heater, electrical energy gets transformed into heat energy.
- When we rub our palms together, they become warm. Here, the muscular (mechanical) energy gets transformed into heat energy.

2. **Structure of a clinical thermometer:** A clinical thermometer is formed of a long and narrow glass tube with a bulb at its one end. This bulb is filled with mercury. The glass tube encloses a thin capillary tube. The capillary tube has a kink just a little above the bulb. Two scales, i.e., Celsius and Fahrenheit scales are shown on the thermometer. The range of Celsius scale on the clinical thermometer is 35°C to 42°C and that of Fahrenheit scale is 94°F to 108°F.

Using a clinical thermometer: Wash and dry the thermometer. Then give it one or two jerks and make sure that the mercury in the capillary tube has fallen well below 35°C. Put the bulb of the thermometer under the tongue for one minute. Take it out and read the temperature.

Clinical thermometer

Precautions to be taken while using a clinical thermometer:

- The thermometer should be washed with an antiseptic lotion or with clean water and dried with a clean dry cloth before and after every use.
- The thermometer should be given two or three soft jerks to bring the mercury in the capillary, well below 35°C.
- While giving jerks, care should be taken that the thermometer does not hit any object, otherwise its delicate bulb is likely to break.
- Thermometer should not be held by the bulb while reading it.
- While the thermometer is inside mouth, one should not laugh or talk or yawn or make any other action.
- Note the reading in clear light. The thermometer can be given small rotations to make the capillary and the level of mercury clearly visible.
- Keep the level of mercury along the line of sight while reading the thermometer.

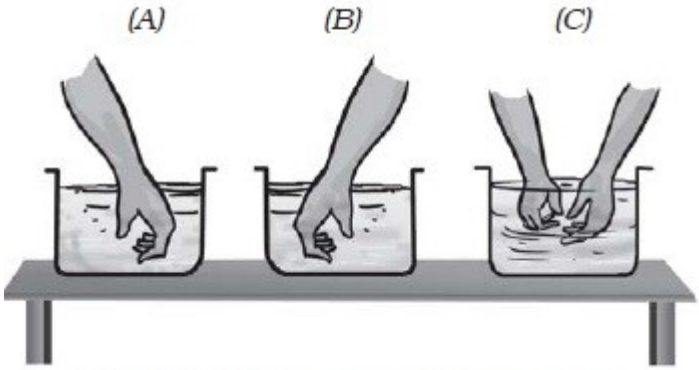
3. Precautions to be taken while using a laboratory thermometer:
   - While the laboratory temperature is being taken, the bulb of the thermometer should be kept vertical and in contact with the object whose temperature is to be measured. It should not touch the bottom or the sides of the container.
   - The reading of temperature should be taken without removing the thermometer from its position.

- The eye of the observer and the mercury in the capillary tube should be at the same level.
- The thermometer should not be used to measure temperatures below its lowest marking or above its highest marking.

4. Our sense of touch is not a reliable method to measure the temperature. This can be proved by performing following activity.

Procedure: Take three bowls and label them A, B and C. Half fill each of the bowls with ice-cold water, bearable hot water and lukewarm water respectively. Now, put your left hand in bowl A and right hand in bowl B simultaneously. Keep your hands in the two bowls for about 1 minute. Then, remove both the hands and put them together in bowl C.

Observation: The left hand feels that the water in bowl C is hot whereas the right hand feels that the water in bowl C is cold.
As the right and left hands do not give same feeling of either hotness or coldness of the water in bowl C, we cannot always rely on our sense of touch.



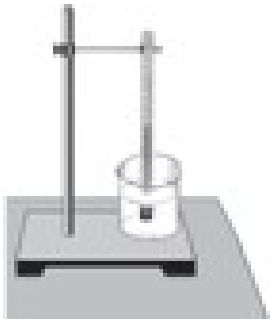
5. The three scales to measure temperature are:
   - **Celsius scale (°C):** On this scale, the freezing point of water is 0°C and boiling point is 100°C.
   - **Fahrenheit scale (°F):** On this scale, the freezing point of water is 32°F and boiling point is 212°F.

- **Kelvin scale (K):** On this scale, the freezing point of water is 273K and boiling point is 373 K.

Interconversion of Scales:

- Interconversion of ◦C and ◦F scales: ◦C = 5/9 (◦F – 32) ; ◦F = 9/5◦C +32
- Interconversion of ºC and K: K = ºC + 273, ºC = K – 273
- **Conversion of 50◦C into ◦F:** ◦F = 9/5 X 50 + 32 = 9X10+32
  = 122◦F

6. A laboratory thermometer consists of a very thin capillary tube of glass, which is surrounded by thick and supportive glass walls. The upper end of the capillary is closed after evacuation and the lower end is drawn into a delicate bulb-like shape, with a thin glass wall. The bulb is filled with mercury. The stem of the thermometer has marks as horizontal lines to read a particular temperature. These marks are known as calibrations. A Laboratory thermometer is generally used to measure temperatures ranging from –10°C
   The temperature of water can be measured using a laboratory thermometer as follows:
   Take a beaker and fill it a little more than half with tap water. Hang a laboratory thermometer on an iron stand such that its bulb is completely dipped in water.



   Observe till the mercury thread in the capillary tube becomes steady and read the level of mercury. This reading gives the temperature of tap water taken in the beaker.

7. **Similarities in laboratory and clinical thermometers:** Both these thermometers are made of glass stem and have a fine capillary tube. Both these have a bulb at one end which is filled with a liquid.

Differences between Laboratory thermometer and Clinical thermometer:

Laboratory Thermometer	Clinical Thermometer
1.A laboratory thermometer is much longer than a clinical thermometer.	1. A clinical thermometer is shorter than a laboratory thermometer.
2. The range of temperature that can be measured with a laboratory thermometer is –10°C to 110°C.	2. The range of temperature for a clinical thermometer is 35°C to 42°C.
3. The laboratory thermometer is read while its bulb is in close contact with the object whose temperature is to be measured.	3. The clinical thermometer is removed from the body to note down the temperature.
4. The laboratory thermometer has a straight capillary.	4. The capillary of a clinical thermometer has a kink, just above its bulb.

G. HOTS Questions:

1. Human beings have little variations in their body temperatures. Actually, the normal body temperature, i.e., 37°C is the average value of body temperatures of a large number of healthy persons.

2. I will use thermometer shown in fig. (a), i.e., clinical thermometer to check temperature of human body. It is not convenient to use a thermometer shown in fig, (b), i.e., laboratory thermometer for measuring human body temperature because we have to take the thermometer out of mouth to note the reading. If we use laboratory thermometer, on taking it out of mouth, the mercury will start falling down in the absence of kink in the capillary tube. Therefore, it is not used to measure human body temperature.

3. The temperature of our body does not fall below 35°C or rise

above 42°C. That is why the range of clinical thermometer is from 35°C to 42°C.

4. Structure 'A' is called a kink. It does not allow mercury to go back into the bulb when thermometer is taken out of mouth for reading.

Passage/case-based Questions:

1. Mercury
2. 35^0 C to 42^0 C